Installation Instructions

ControlLogix SERCOS interface Module

Catalog Number 1756-M03SE, 1756-M08SE, 1756-M16SE, 1756-M08SEG

The ControlLogix® SERCOS interface™ module links a ControlLogix controller to SERCOS interface drives. The module uses fiber optic connections for all field-side wiring.

To control up to this many drives	Use this module	Which lets you control the drives in these modes		
		Position	Velocity	Torque
3 SERCOS interface drives	1756-M03SE	yes	yes	yes
8 SERCOS interface drives	1756-M08SE	yes	yes	yes
16 SERCOS interface drives	1756-M16SE	yes	yes	yes
8 SERCOS interface drives that are Extended Pack Profile compliant	1756-M08SEG	yes	no	no

Before You Install the Module

Before you install your module:

- ☑ Install and ground a ControlLogix chassis.
- ☑ Install a ControlLogix power supply.
- ☑ Get the fiber optic cables for your application.

Publication 1756-IN572G-EN-P - May 2005

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://www.ab.com/manuals/gi) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary we use notes to make you aware of safety considerations.

WARNING	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
ATTENTION	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you: • identify a hazard • avoid a hazard • recognize the consequence
SHOCK HAZARD	Labels may be located on or inside the equipment (e.g., drive or motor) to alert people that dangerous voltage may be present.
BURN HAZARD	Labels may be located on or inside the equipment (e.g., drive or motor) to alert people that surfaces may be dangerous temperatures.

Documentation

To	See	Publication number
set up and program motion control	Logix5000 Motion Module User Manual	1756-UM006
program motion instructions	Logix5000 Controller Motion Instructions Reference Manual	1756-RM007
install, wire, and set up a 1394C-SJTxx-D drive	1394 SERCOS Interface Multi Axis Motion Control System	1394C-5.20
start up and troubleshoot a 1394 drive with SERCOS	1394 SERCOS Integration Manual	1394-IN024
install an Ultra3000 drive	Ultra3000 Hardware Installation Manual	2098-IN003
start up and troubleshoot an Ultra3000 drive with SERCOS	Ultra3000 SERCOS Integration Manual	2098-IN005
design, install, and wire a Kinetix 6000 drive	Kinetix 6000 Installation Manual	2094-IN001
start up and troubleshoot a Kinetix 6000 drive with SERCOS	Kinetix 6000 Integration Manual	2094-IN002
use the 8720MC High Performance Drive	8720MC High Performance Drive User Manual	8720MC-UM001

SERCOS interface is a trademark of the Interests Group SERCOS interface ve.V. of Stuttgart, Germany.
Rockwell Automation is a member of the SERCOS NA.

How to Handle ControlLogix Components

ATTENTION

Preventing Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.
- When not in use, store the equipment in appropriate static-safe packaging.

Install the Module

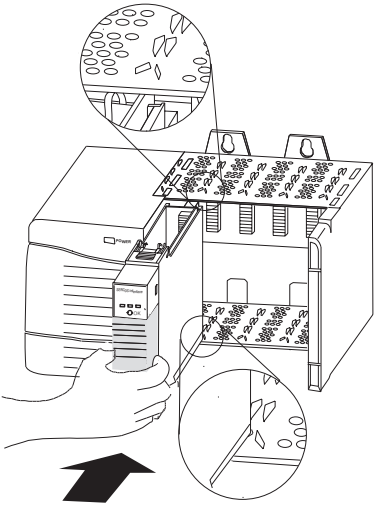
WARNING

When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations.

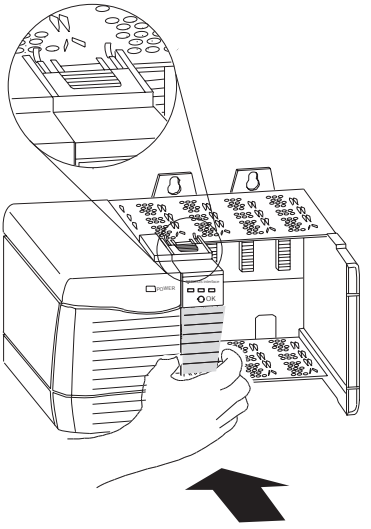
Be sure that power is removed or the area is nonhazardous before proceeding. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

You can install or remove this module while chassis power and field-side power are on.

1. Align the circuit board with the top and bottom guides of the chassis.



2. Slide the module into the chassis. Make sure the top and bottom locking tabs snap into place.



Connect the Fiber Optic Cables

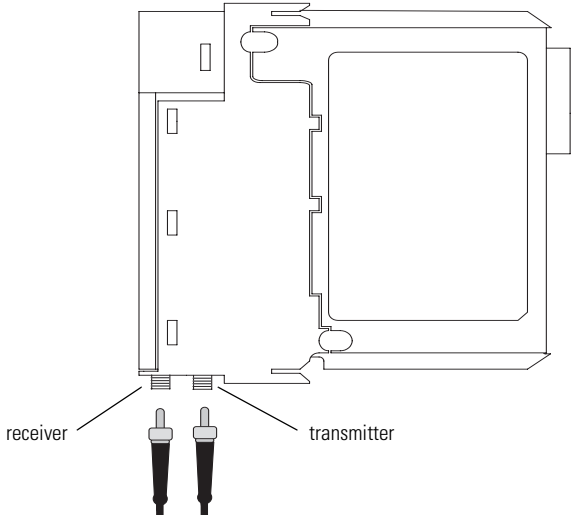
ATTENTION

You must give a unique address to each drive on the SERCOS ring. If you give 2 drives the same address on the same ring, both drives respond to commanded motion. This could injure people or damage equipment.

ATTENTION

Under certain conditions, viewing the optical port may expose the eye to hazard. When viewed under some conditions, the optical port may expose the eye beyond the maximum permissible exposure recommended in ANSI Z136.2, 1993.

ControlLogix SERCOS interface modules use fiber optics that are rated Class 1 for IEC LED safety classification. Under most viewing conditions, there is no eye hazard.



1. Remove the protective end caps from the receiver and transmitter ports.

2. Insert each fiber optic cable into the appropriate port and screw on finger tight. The cable that emits light is the transmitter.

Any break in the ring disables the SERCOS network and creates a warning a on the SERCOS Ring Status LED.

Interpret the LED Indicators

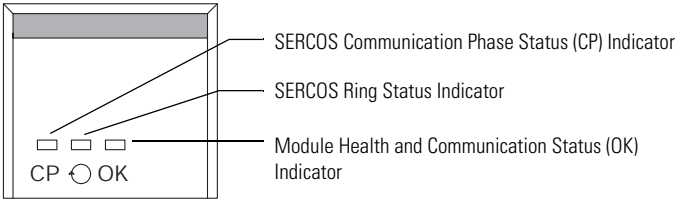


Table 1 SERCOS Communication Phase Status (CP) Indicator

State	Description
Solid Orange	Phase -1: Autobaud detection in progress.
OFF	Phase 0: looking for a closed ring.
Flashing Red	Phase 1: looking for active nodes.
Alternating Red/Green	Phase 2: configuring nodes for communication.
Flashing Green	Phase 3: configuring device specific parameters
Solid Green	Phase 4: configured and active.

Table 2 SERCOS Ring Status Indicator

State	Description	Recommended Action
Solid Green	The ring, drive, and axes are configured and actively communicating through to the nodes on the ring.	None.

Table 2 SERCOS Ring Status Indicator (Continued)

State	Description	Recommended Action
Flashing Red	The module has detected a setup or configuration fault with the ring.	Check your system setup and configuration as follows:. • Ensure drive and axes addresses are correct. • Remove excess axes from ring. • Make sure application program has selected the proper Ring Cycle Period and Baud Rate.
Solid Red	The module has detected a hardware or installation fault with the ring.	Check your system hardware and installation as follows: • Make sure all cables are properly installed. • Make sure cable is of the correct type and length. • Make sure application program has configured the module's ring transmit level to High when using specified cables. • Make sure the drive's transmit levels are set appropriately. • Inspect cables for degradation. • Inspect drives for any faults and correct them.
Off	The module has detected no ring data on its receiver or has not successfully completed phase 2.	Check your system and installation as follows: • Make sure all cables are properly installed • Inspect cable for degradation and breakage. • Inspect drives for faults.
Flashing Green	The ring, drive, or axes are not configured but at least one has been identified.	Not a problem if the system has not been configured. If you are having trouble configuring the ring, drive, and axes, make sure that the RSLogix 5000 project is setup properly for the equipment in use.

Table 3 Module Health and Communication Status (OK) Indicator

State	Description	Recommended Action
Off	The module is not operating.	• Apply chassis power. • Verify the module is completely inserted into the chassis and backplane.
Flashing Green	The module has passed internal diagnostics, but has not established active communications.	None, if you have not configured the module.
Solid Green	• Data is being exchanged. • The module is in the normal operating state.	None. The module is ready for action.
Flashing Red	• A major recoverable failure has occurred. • An NVS update is in progress.	If an NVS update is in progress, complete the NVS update. If an NVS update is not in progress: Reboot
Solid Red	A potential nonrecoverable fault has occurred.	• Reboot the module. • If the solid red persists, replace the module.

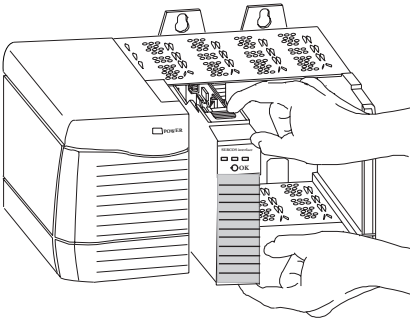
Remove the Module from the Chassis, If Required

WARNING

When you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations.

Be sure that power is removed or the area is nonhazardous before proceeding. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance that can affect module operation.

1. Push in and hold the top and bottom locking tabs on the module.
2. Pull the module out of the chassis.



Fiber Optic Cables

ATTENTION

Under certain conditions, viewing the optical port may expose the eye to hazard. When viewed under some conditions, the optical port may expose the eye beyond the maximum permissible exposure recommended in ANSI Z136.2, 1993.

Table 4 Choose a Plastic Fiber Optic Cable

For use in:	Use this type of plastic cable:	Length in meters (inches)	Allen-Bradley Catalog Number
electrical cabinet	non-jacketed (Chlorinated Polyethylene)	1 m (39 in)	2090-SCEP1-0
		3 m (118 in)	2090-SCEP3-0
		5 m (197 in)	2090-SCEP5-0
		8 m (315 in)	2090-SCEP8-0
		10 m (394 in)	2090-SCEP10-0
		15 m (591 in)	2090-SCEP15-0
		20 m (787 in)	2090-SCEP20-0
		25 m (984 in)	2090-SCEP25-0
		32 m (1260 in)	2090-SCEP32-0
normal environments outside of an electrical cabinet	standard jacket (Polyvinyl Chloride)	1 m (39 in)	2090-SCVP1-0
		3 m (118 in	2090-SCVP3-0
		5 m (197 in)	2090-SCVP5-0
		8 m (315 in)	2090-SCVP8-0
		10 m (394 in)	2090-SCVP10-0
		15 m (591 in)	2090-SCVP15-0
		20 m (787in)	2090-SCVP20-0
		25 m (984 in)	2090-SCVP25-0
		32 m (1260 in)	2090-SCVP32-0

Table 4 Choose a Plastic Fiber Optic Cable (Continued)

For use in:	Use this type of plastic cable:	Length in meters (inches)	Allen-Bradley Catalog Number
harsh environment	nylon jacketed	1 m, (39 in)	2090-SCNP1-0
		3 m, (118 in)	2090-SCNP3-0
		5 m (197 in)	2090-SCNP5-0
		8 m (315 in)	2090-SCNP8-0
		10 m (394 in)	2090-SCNP10-0
		15 m (591 in)	2090-SCNP15-0
		20 m (787 in)	2090-SCNP20-0
		25 m (984 in)	2090-SCNP25-0
		32 m (1260 in)	2090-SCNP32-0

Table 5 Choose a Glass Fiber Optic Cable (Polyvinyl Chloride Jacket for Use in Normal Environments)

Length in meters (inches)	Allen-Bradley Catalog Number
1 m (39 in)	2090-SCVG1-0
3 m (118 in)	2090-SCVG3-0
5 m (197 in)	2090-SCVG5-0
8 m (315 in)	2090-SCVG8-0
10 m (394 in)	2090-SCVG10-0
15 m (591 in)	2090-SCVG15-0
20 m (787 in)	2090-SCVG20-0
25 m (984 in)	2090-SCVG25-0
32 m (1260 in)	2090-SCVG32-0
50 m (1970 in)	2090-SCVG50-0
100 m (3937 in)	2090-SCVG100-0

Care and Handling of Fiber Optic Cables

ATTENTION

When you handle these components, take normal precautions to prevent damage and/or degradation by electrostatic discharge (ESD). The small junction size of these components increases their susceptibility to damage from ESD.

Good system performance depends on clean port optics and cable ferrules, which keeps dust and small particles from blocking the optic path.

- When cables are not in use, keep the ends covered with the dust covers that came with the cables.
- To clean the ends of the cables, use either:
  - compressed air
  - one of the following cleaners on a lint and strand free cotton swab:

Alcohols	Aliphatics	Other
methyl	hexane	soap solution
isopropyl	heptane	naphtha
isobutyl		

For more information about the care, handling, and installation of fiber optic cables see the *Fiber Optic Cable Installation and Handling Instructions*, publication number 2090-IN010x-EN-P.

Specifications

Description	Value
Power Dissipation	5.0W
Backplane Current	760 mA @ 5.1V dc
	2.5 mA @ 24V dc
Operational Temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): • 0 to 60°C (32 to 140°F)
Storage Temperature	IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): • -40 to 85°C (-40 to 185°F)
Relative Humidity	IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat): • 5 to 95% non-condensing
Vibration	IEC 60068-2-6 (Test Fc, Operating): • 2g @ 10-500Hz
Operating Shock	IEC 60068-2-27 (Test Ea, Unpackaged Shock): • 30g
Non-Operating Shock	IEC 60068-2-27 (Test Ea, Unpackaged Shock): • 50g
Emissions	CISPR 11: Group 1, Class A
ESD Immunity	IEC 61000-4-2: • 4kV contact discharges • 8kV air discharges
Radiated RF Immunity	IEC 61000-4-3: • 10V/m with 1kHz sine-wave 80%AM from 80MHz to 2000MHz • 10V/m with 200Hz 50% Pulse 100%AM at 900Mhz • 10V/m with 200Hz 50% Pulse 100%AM at 1890Mhz
Enclosure Type Rating	None (open-style)

Description	Value		
Number of Drives	1756-M03SE	Up To 3 SERCOS interface drives	
	1756-M08SE	Up to 8 SERCOS interface drives	
	1756-M16SE	Up to 16 SERCOS interface drives	
	1756-M08SEG	Up to 8 SERCOS interface drives. You must use drives that are Extended Pack Profile compliant.	
SERCOS interface Data Rate	1756-M03SE	4 Mbits or 8 Mbits per second	
	1756-M08SE	4 Mbits or 8 Mbits per second	
	1756-M16SE	4 Mbits or 8 Mbits per second	
	1756-M08SEG	4 Mbits per second	
SERCOS interface Cycle Time	**Important**: Only Kinetix 6000 drives let you use a 0.5 ms cycle time.		
	Data rate	**Number of drives**	**Cycle time**
	4 Mb	up to 2	0.5 ms
		up to 4	1 ms
		up to 8	2 ms
		You can't use more than 8 drives at a 4 Mb data rate.	
	8 Mb	up to 4	0.5 ms
		up to 8	1 ms
		up to 16	2 ms
Plastic Fiber Optic Cable	Transmission Range	1-32 meters	
	Core Diameter	980µm ± 60µm	
	Cladding Diameter	1000µm ± 60µm	
	Cable Attenuation	140 dB/km @ 650nm	
	Operating Temperature	-55 to 85° C	
	Connector	F-SMA standard screw-type connector	
	Bend Radius	2.5 cm	

Description	Value	
Glass Fiber Optic Cable	Transmission Range	1-200 meters
	Core Diameter	200μm ± 4μm
	Cladding Diameter	230μm + 0 / – 10μm
	Cable Attenuation	6.0 dB/km @ 820nm
	Operating Temperature	-20 to 85° C
	Connector	F-SMA standard screw-type connector
	Bend Radius	2.5cm

Certifications

When marked, the module has the following certifications. See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Certification	Description
c-UL-us	UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada
CE	European Union 89/336/EEC EMC Directive, compliant with: • EN 50082-2; Industrial Immunity • EN 61326; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions
C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions

Environment and Enclosure Information

ATTENTION

Environment and Enclosure

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as "open type" equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

NOTE: See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure. Also, see the appropriate sections in this publication, as well as the Allen-Bradley publication 1770-4.1 ("Industrial Automation Wiring and Grounding Guidelines"), for additional installation requirements pertaining to this equipment.

North American Hazardous Location Approval

The following information applies when operating this equipment in hazardous locations:	**Informations sur l'utilisation de cet équipement en environnements dangereux:**
Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.	Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.
WARNING **EXPLOSION HAZARD** • Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous. • Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product. • Substitution of components may impair suitability for Class I, Division 2. • If this product contains batteries, they must only be changed in an area known to be nonhazardous.	**AVERTISSEMENT** **RISQUE D'EXPLOSION** • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement. • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit. • La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using its products. At http://support.rockwellautomation.com, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect Support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://support.rockwellautomation.com.

Installation Assistance

If you experience a problem with a hardware module within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your module up and running:

United States	1.440.646.3223 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned:

United States	Contact your distributor. You must provide a Customer Support case number (see phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for return procedure.

www.rockwellautomation.com

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